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## Energy Code Requirements for Residential Construction

### 2015 Illinois Energy Conservation Code

Building Inspectors: Charles Montgomery 403-6115 Kaelob Capel 403-6107

#### **Compliance Methods Available:**

1. Prescriptive Method OR REScheck version 4.6.2 or better
2. Energy Rating Index analysis (completed by an approved third party)
3. Simulated Performance Alternative 6 approval compliance software
  - REM/Rate REM/Design V15 or better (completed by a HERS rater)
4. Energy Rating Index Compliance Alternative (ERI) (completed by HERS rater)
5. Architect or Structural Engineer (with completed compliance report)

#### **Prescriptive Insulation Information**

- The Building Thermal Envelope shall meet the requirements of *Table 402.1.2* based on Climate Zone 5. Provide the following applicable information using a wall section:
  1. Fenestration U-factor U-.32 minimum (*Table 402.1.3*)
  2. Skylight U-factor U-.55 minimum
  3. Ceiling R-value R-49 minimum
  4. Wood frame wall R-value R-20 or 13+5 min (note h)
  5. Mass wall R-value R-13/17
  6. Floor R-value R-30 (note g)
  7. Basement wall R-value R-15/19 minimum 4' below grade
  8. Slab R-value R-10, 2ft.
  9. Crawlspace R-value R-15/19 (Refer to 402.2.11 for alternative methods)
- All R-values and U-factors must be labeled in the field.
- Ducts (Prescriptive) - Supply ducts in attics shall be insulated to a minimum of R-8 and all other ducts to R-6. (For unconditioned spaces only.)
- Lighting equipment (Prescriptive) - A minimum of 75 percent of the lamps in permanently installed lighting fixtures shall be high-efficiency lamps.

#### **Mandatory items - Prescriptive & Performance**

Air Leakage 6 The building thermal envelope shall be constructed to limit air leakage in accordance with the requirements of section R402.4.

- Air Sealing and insulation shall be considered acceptable when tested with a blower door test performed by a certified HERS or BPI rater. 5ACH @ 50Pa maximum.

- MEP Systems - All mandatory items per Section 403. The building or dwelling unit shall be provided with a whole-house mechanical ventilation designed in accordance with Section R403.6.
- Certificate 6 A permanent certificate shall be completed by the builder or registered design professional and posted on a wall in the space where the furnace is located, a utility room or an approved location inside the building. The certificate shall list the predominant R-values of insulation installed in or on ceiling/roof, walls, foundation (slab, basement wall, crawlspace wall and floor) and ducts outside conditioned spaces; U-factors for fenestration, and the results from any required duct system and building envelope air leakage testing done on the building. Where there is more than one value for each component, the certificate shall list the value covering the largest area. The certificate shall list the types and efficiencies of heating, cooling and service water heating equipment (See example on our website).
- Duct testing 6 Ducts shall be pressure tested to determine air leakage during the rough-in or post construction (R403.3.3). Exception: A duct air leakage test shall not be required where the ducts and air handlers are located entirely within the building thermal envelope. A written report of the results of the test shall be signed by the party conducting the test and provided to code official.

## RESIDENTIAL ENERGY EFFICIENCY

**TABLE R402.4.1.1  
AIR BARRIER AND INSULATION INSTALLATION**

COMPONENT	AIR BARRIER CRITERIA	INSULATION INSTALLATION CRITERIA
General requirements	A continuous air barrier shall be installed in the building envelope. The exterior thermal envelope contains a continuous air barrier. Breaks or joints in the air barrier shall be sealed.	Air-permeable insulation shall not be used as a sealing material.
Ceiling/attic	The air barrier in any dropped ceiling/soffit shall be aligned with the insulation and any gaps in the air barrier shall be sealed. Access openings, drop down stairs or knee wall doors to unconditioned attic spaces shall be sealed.	The insulation in any dropped ceiling/soffit shall be aligned with the air barrier.
Walls	The junction of the foundation and sill plate shall be sealed. The junction of the top plate and the top of exterior walls shall be sealed. Knee walls shall be sealed.	Cavities within corners and headers of frame walls shall be insulated by completely filling the cavity with a material having a thermal resistance of R-3 per inch minimum. Exterior thermal envelope insulation for framed walls shall be installed in substantial contact and continuous alignment with the air barrier.
Windows, skylights and doors	The space between window/door jambs and framing, and skylights and framing shall be sealed.	
Rim joists	Rim joists shall include the air barrier.	Rim joists shall be insulated.
Floors (including above garage and cantilevered floors)	The air barrier shall be installed at any exposed edge of insulation.	Floor framing cavity insulation shall be installed to maintain permanent contact with the underside of subfloor decking, or floor framing cavity insulation shall be permitted to be in contact with the top side of sheathing, or continuous insulation installed on the underside of floor framing and extends from the bottom to the top of all perimeter floor framing members.
Crawl space walls	Exposed earth in unvented crawl spaces shall be covered with a Class I vapor retarder with overlapping joints taped.	Where provided instead of floor insulation, insulation shall be permanently attached to the crawlspace walls.

Shafts, penetrations	Duct shafts, utility penetrations, and flue shafts opening to exterior or unconditioned space shall be sealed.	
Narrow cavities		Batts in narrow cavities shall be cut to fit, or narrow cavities shall be filled by insulation that on installation readily conforms to the available cavity space.
Garage separation	Air sealing shall be provided between the garage and conditioned spaces.	
Recessed lighting	Recessed light fixtures installed in the building thermal envelope shall be sealed to the drywall.	Recessed light fixtures installed in the building thermal envelope shall be air tight and IC rated.
Plumbing and wiring		Batt insulation shall be cut neatly to fit around wiring and plumbing in exterior walls, or insulation that on installation readily conforms to available space shall extend behind piping and wiring.
Shower/tub on exterior wall	The air barrier installed at exterior walls adjacent to showers and tubs shall separate them from the showers and tubs.	Exterior walls adjacent to showers and tubs shall be insulated.
Electrical/phone box on exterior walls	The air barrier shall be installed behind electrical or communication boxes or air-sealed boxes shall be installed.	
HVAC register boots	HVAC register boots that penetrate building thermal envelope shall be sealed to the subfloor or drywall.	
Concealed sprinklers	When required to be sealed, concealed fire sprinklers shall only be sealed in a manner that is recommended by the manufacturer. Caulking or other adhesive sealants shall not be used to fill voids between fire sprinkler cover plates and walls or ceilings.	

a. In addition, inspection of log walls shall be in accordance with the provisions of ICC-400.

## **SIMULATED PERFORMANCE ALTERNATIVE**

- Be HERS certified and meet the testing requirements. (Blower door test and duct test)
- Compliance report shall meet the requirements of R405.4.2 and meet all specifications in *Table 405.5.2(1)*, 2015 IECC.
  - One with the application report (see R405.4.2.1)
  - One for final occupancy (see R405.4.2.2)